Have #53

File

Incendiary, General

PROGRESS REPORT

FOR

AUGUST 1960

ON THE

SIGNAL FLARE TESTING

RD 45, TASK ORDER LL

19 September 1960

During the month of August 1960, all the shipments of railroad flares were received and their testing was started. A considerable portion of the tests were completed by the end of August.

The first series of tests consisted of burning 20 flares of each brand under ambient conditions from which the following results were noted.

I. Standard Railway Fusee Corp. (Red)

A. Of the 20 tested, 3 did not continue to burn after ignition, but when re-lit with another flare, they did burn completely.

B. These flares gave very little chimneying and were easy to ignite. They had a flame length of about 2-1/2" - 3" as did all the red flares from the other companies.

C. Average time to full flame was 2 minutes; maximum burning time 33 minutes; minimum burning time 31 minutes and average burning time 31.76 minutes.

II. Olin Mathieson Chemical Corp. (Red)

A. Of the 20 tested, 3 did not continue to burn after ignition, but when re-lit with another flare, they did burn completely.

B. Four of these flares were chimneying rather strongly and most of them were hard to ignite and were also slow starting once ignited.

C. Average time to full flame was 2 minutes; maximum burning time 38 minutes; minimum burning time 35 minutes and average burning time 36.29 minutes.

III. Bristol Flare Corp. (Red)

A. All 20 burned to completion following ignition.

B. Half of these flares were chimneying strongly; 6 were difficult to ignite, but most of them had a fast start, once ignited.

C. Average time to full flame was 1-1/2 minutes; maximum burning time 34 minutes; minimum burning time 30 minutes and average burning time 32.26 minutes.

IV. Bristol Flare Corp. (Yellow)

A. All 20 burned to completion following a fast start after ignition.

B. Chimneying was slight and ease of ignition was very good on these flares. The flame length was 3-1/2" - 4".

C. Average time to full flame was 1-1/4 minutes; maximum burning time was only 20 minutes; minimum burning time 17 minutes and average burning time 18.5 minutes.

V. International Flare Signal Division (Kilgore) (Red)

A. One out of 20 failed to burn after ignition, but when re-lit with another flare continued to burn satisfactorily.

B. Most of these flares were easy to ignite but were chimneying excessively. Eleven had loose plastic base plugs. Five had cracked or loose matchheads.

C. Average time to full flame was 1-1/2 minutes; maximum burning time 37 minutes; minimum burning time 32 minutes and average burning time 34.95 minutes.

VI. International Flare Signal Division (Kilgore) (Yellow)

A. Nine out of 20 of these flares went out soon after ignition and most of these went out again after being re-lit with another flare.

B. Most of these flares were easy to ignite, but were chimneying excessively. Some had very poor flames and the flame was often barely visible.

C. Time to full flame ranged from 1 minute to 3-1/2 minutes; maximum burning time 37 minutes; minimum burning time 28 minutes and average burning time 30.54 minutes.

The second test consisted of burning 10 flares of each brand immediately after they had been kept in an oven at 110°F for five days. The following results were noted:

I. Standard Railway Fusee Corp. (Red)

A. Ease of ignition and chimneying satisfactory.

B. Average time to full flame was 1-1/2 minutes; maximum burning time 31 minutes; minimum

burning time 29 minutes and average burning time 29.9 minutes.

II. Olin Mathieson Chemical Corp. (Red)

A. Ease of ignition and chimneying were both all right.

B. Average time to full flame was 1-1/2 minutes; maximum burning time 33 minutes; minimum burning time 30 minutes and average burning time 32.3 minutes.

III. Bristol Flare Corp. (Red)

A. Ease of ignition was fair and chimneying effect excessive.

B. Average time to full flame was 1-1/2 minutes; maximum burning time 32 minutes; minimum burning time 29 minutes and average burning time 30.7 minutes.

IV. Bristol Flare Corp. (Yellow)

A. Ease of ignition was very good and chimneying was slight.

B. Average time to full flame was 1 minute; maximum burning time 19 minutes; minimum burning time 18 minutes and average burning time 18.7 minutes.

V. International Flare Signal Division (Kilgore) (Red)

A. One out of 10 failed to burn after ignition because the matchhead fell out when struck.

In all but three flares, either the matchhead was loose or plastic plug was loose.

B. Ease of ignition was good but chimneying effect very bad.

C. Time to full flame was 1-1/2 minutes; maximum burning time 33 minutes; minimum burning time 21 minutes and average burning time 30.22 minutes.

VI. International Flare Signal Division (Kilgore) (Yellow)

A. Ease of ignition was good but chimneying was excessive. Flame length was 3" - 3-1/2".

B. Time to full flame was 1-1/2 minutes; maximum burning time 28 minutes, minimum burning time 20 minutes and average burning time 26.2 minutes.

The third test consisted of burning 10 of each brand of flare immediately after they had been stored at -20°F for five days. The following results were noted.

I. Standard Railway Fusee Corp. (Red)

A. Only one out of the 10 flares ignited and burned to completion; the rest ignited and then went out but when re-lit did burn to completion.

B. The one flare that burned satisfactorily had a time to full flame of 2 minutes and a burning time of 32 minutes.

II. Olin Mathieson Chemical Corp. (Red)

A. Nine out of 10 ignited and burned to completion. On the tenth one, the striker was damp and would

not ignite the matchhead, but the flare did start from another flare and continued to burn.

B. Time to full flame was 2-1/2 minutes; maximum burning time 38 minutes; minimum burning time 36 minutes and average burning time 37.1 minutes.

C. Half of these flare were difficult to ignite and all of them did some chimneying.

III. Bristol Flare Corp. (Red)

A. All ten ignited. Ease of ignition was fair and chimneying effect was poor on these flares.

B. Time to full flame was 1-1/2 minutes; maximum burning time 35 minutes; minimum burning time 32 minutes and average burning time 33.1 minutes.

IV. Bristol Flare Corp. (Yellow)

A. All ten ignited. Ease of ignition and chimneying effect were good on all of these flares.

B. Average time to full flame was 1-1/4 minutes; maximum burning time 20 minutes; minimum burning time 17 minutes and average burning time 19.1 minutes.

V. International Flare Signal Division (Kilgore) (Red)

A. The ease of ignition was good but the chimneying was excessive on all of these flares.

B. Eight out of 10 of these flares had the plastic base plugs loose and one out of 10 ignited, then went out and could not be re-lit even from another flare.

C. Average time to full flame was 1-1/2 minutes; maximum burning time 38 minutes; minimum burning time 34 minutes and average burning time 35.44 minutes.

VI. International Flare Signal Division (Kilgore) (Yellow)
All ten ignited but none of these flares burned to completion after ignition and three could not be re-lit from another flare.

The appearance of the Kilgore flares indicated that they may have been aged or moisture damaged. A humidity and temperature check was made of our magazine where the flares had been stored since their arrival here. The temperature for a one week period remained fairly constant at 73°F and the humidity averaged 74%.

The last test which was performed this month was to submerge the flares in water for 10 minutes, then try to burn them. This is in accordance with one of the tests as specified in the Bureau of Explosives Specifications for Red Railroad Fusees. The Bristol yellow flare was the only one which would burn after igniting, though the Standard red did ignite on striking, but then went out.

Because of the poor quality of the Kilgore flares, a letter was written to the company asking them if they would care to replace the unsatisfactory flares with new items from a more recent production. An answer was received stating that they would send a new shipment of standard production items both of the red and yellow flares. Upon their arrival in September, we will put them through the same tests as the previous flares.

Kilgore recommended a 45° angle for intermittent dropping-off of the "scoria" (chimney) but the spike on all the flares is so short (1¼ to 1½") that even vertical positioning is difficult.

It is our opinion at this point that the commercial fusee and especially a now standard item such as the 30 minutes flare is a poor field item for important and perhaps critical tactical applications.

FINANCIAL STATEMENT

Total Amount of Contract	$ 3,372.00
Expenditures for August 1960	1,076.98
Total Expenditures to 31 August 1960	1,162.61
Balance of Contract	2,209.39

Expiration Date: 23 November 1960